

REMARKS

Favorable reconsideration of this application, in light of the preceding amendments and following remarks, is respectfully requested.

Claims 1-36 are pending in this application. Claims 1, 15, and 29-36 are independent claims. Claims 1, 15, 29 and 33 are currently amended. No claims have been cancelled.

Applicants note with appreciation the Examiner's acknowledgement that certified copies of all priority documents have been received by the U.S.P.T.O. Action, summary at 12.

Applicants also respectfully note the present action indicates that the drawings have been accepted by the Examiner. Action, summary at 10.

CLAIM OBJECTIONS

Claims 1-28 are objected to due to minor informalities. Applicants have made the necessary amendments to the claims in an attempt to overcome the objection.

REJECTIONS UNDER 35 U.S.C. § 102

Claims 30 & 34 are rejected under 35 U.S.C. § 102(b) as being anticipated by Raleigh et al. (hereinafter Raleigh) (U.S. Patent 6,158,041). Applicants respectfully traverse this rejection for the reasons detailed below.

Independent claim 30 recites –

“A squared Euclidean distance calculating device for an apparatus for direct measurement of a channel state of a receiver, comprising:

a calculating unit which receives a complex signal for a carrier and calculates **a squared value of a signal for I (In-phase) and a squared value of a signal for Q (Quadrature) of the**

carrier and outputs an error, which is a sum of the squared values, wherein the error is used to improve channel state estimation.” (Emphasis Added)

Raleigh is directed to a high performance system and method for trellis coded modulation. Figure 7 of Raleigh illustrates a block diagram of a demodulator and decoder. Computational elements 418a and 418b receive PAM symbols and compute the soft decisions for each of the PAM symbols. Computation elements 418 compute the possible PAM constellation states based on the squared Euclidean distance between the actual received symbol value (I symbol value for 418a and Q symbol value for 418b) and the ideal constellation value.

Unlike as recited by independent claim 30, element 418a of Raleigh generates an output based on the squared Euclidean distance between the I (In-phase) symbol stream and the ideal constellation value.

Similarly, element 418b generates an output based on the squared Euclidean distance between the Q (Quadrature) symbol stream and the ideal constellation value.

Raleigh therefore does not anticipate claim 30 and the somewhat similar features recited in method claim 34.

The Applicants, therefore, respectfully request that the rejection to Claims 30 & 34 under 35 U.S.C. § 102(b) be withdrawn.

Claims 29 & 33 are rejected under 35 U.S.C. § 102(b) as being anticipated by Fertner (U.S. Patent 6,185,251 B1). Applicants respectfully traverse this rejection for the reasons detailed below.

Amended claim 33 recites –

“A method of non-recursively filtering a carrier for direct measurement of a channel state of a receiver, comprising:

delaying a first error by one or more carriers; and

multiplying filtering coefficients by a present carrier value and the one or more delayed carrier values and outputting a second error which is a sum of the multiplied values, **wherein the filtering coefficients are output by an adaptation unit using a signal corresponding to an inverse number of the squared magnitude of the channel frequency response** and the second error signal is used to improve channel state estimation.” (Emphasis Added)

Fertner provides an optimal procedure for determining equalizer coefficients for an equalizer. In column 5, lines 37-48, Fertner discloses –

The present invention finds particular advantageous application in the training of the time domain equalizer 52. During a training mode of operation, a switch 51 is actuated (for example by a general data processor controlling the receiver) to connect the output of the analog-to-digital converter 50 to an equalizer filter coefficients processor 53 which calculates optimal TEQ coefficient values for a particular communications channel. Those optimal values are used to set the coefficients in equalizer 52. After training, the switch 51 is moved to directly connect the sampled output from the ADC to the equalizer 52 for operation in the normal equalization mode.

According to the above cited language of Fertner, and illustrated in figure 4 of Fertner, sampled signal x_n is input to the equalizer filter coefficients processor 53 and is also directly connect to the equalizer 52 by moving a switch 51. Thus, in the training mode of operation the sampled signal x_n of Fertner is used to calculate the time domain equalizer coefficients and in the normal mode of operation the delayed values of x_n are multiplied with corresponding filter coefficient value TEQ to output signal y_n .

Accordingly, Applicants respectfully submit that Fertner fails to disclose, teach, or suggest a method of non-recursively filtering a carrier for direct measurement of a channel state of a receiver of amended claim 33 reciting, *inter alia*, “**wherein the filtering coefficients are output by an adaptation unit using a signal corresponding to an inverse number of the squared magnitude of the channel frequency response**”

Fertner therefore fails to anticipate the limitations of claim 33 and the somewhat similar features of independent claim 29.

The Applicants, therefore, respectfully request that the rejection to Claims 29 & 33 under 35 U.S.C. § 102(b) be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 31 & 35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiou et al, (hereinafter Chiou) (U.S. Publication 2004/0218519 A1) in view of Bohnke et al. (hereinafter Bohnke) (U.S. Publication 2002/0060990 A1). Applicants respectfully traverse this rejection for the reasons detailed below.

Independent claim 31 recites –

“An adaptation device for an apparatus for direct measurement of a channel state of a **receiver**, comprising:

an estimating unit which estimates a correlation coefficient signal of two or more adjacent carriers using a signal corresponding to an inverse a squared magnitude of the channel frequency response; and

a filter coefficient selection unit which outputs filtering coefficients belonging to a filtering coefficient group selected according to the estimated correlation coefficient signal,

wherein the filtering coefficients are used to improve channel state estimation.” (Emphasis Added)

Chiou is directed to an apparatus and method for estimation of channel state information (CSI) in OFDM receivers.

The Examiner admits Chiou fails to disclose “the correlation coefficient signal of tow or more adjacent carrier using a signal corresponding to an inverse of squared magnitude of the channel frequency response” (See Office Action Page 5) and relies on Bohnke to teach the feature.

Bohnke is directed to a method for adjusting the transmission characteristics of subcarriers of a multi carrier transmission system using a plurality of antenna elements. Figures 2-5 of Bohnke illustrate various antenna selection techniques in the case of an application to two antenna elements.

In paragraph [0043], Bohnke discloses a TX antenna selection technique according to which the best suited antenna element for each subcarrier can be chosen at the transmitter. In paragraph [0044] Bohnke discloses another technique (MRC) applied to a two antenna transmission system. In paragraph [0045] Bohnke discloses –

According to the present invention an antenna diversity and pre-equalizing step can be additionally used at the transmitter. The transmitter antenna diversity technique includes the above explained TX antenna selection technique and the MRC method

According to the above cited language and paragraphs [0043] – [0044] of Bohnke, the techniques of Bohnke work at the transmitting end of the OFDM system, unlike as recited by independent claim 31. Bohnke fails to cure the deficiencies of Chiou. The improper combination

of Chiou and Bohnke renders claim 31 non-obvious to one of ordinary skill in the art. Method claim 35 features somewhat similar to claim 31 and therefore the same argument applies.

The Applicants, therefore, respectfully request that the rejection to Claims 31 & 35 under 35 U.S.C. § 103(a) be withdrawn.

Claims 32 & 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiou et al. (hereinafter Chiou) (U.S. Publication 2004/0218519 A1), in view of Fertner (U.S. Patent 6,185,251 B1), and further in view of Raleigh et al. (hereinafter Raleigh) (U.S. Patent 6,158,041). Applicants respectfully traverse this rejection for the reasons detailed below.

Independent claim 32 recites features somewhat similar to independent claims 29, 30 and 31. Arguments with respect to claims 29, 30 and 31 also therefore apply to claim 32.

Method claim 36 recites features somewhat similar to claim 32. Argument with respect to claim 36 also therefore applies to claim 32.

Accordingly, claims 32 and 36 are rendered non-obvious to one of ordinary skill in the art by Chiou in view of Fertner, and further in view of Raleigh.

The Applicants, therefore, respectfully request that the rejection to Claims 32 & 36 under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) hereby petition(s) for a two (2) month extension of time for filing a reply to the outstanding Office Action and submit the required \$450 extension fee herewith.

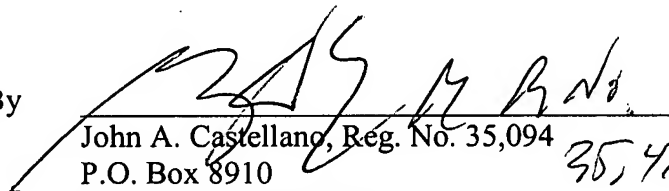
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John A. Castellano, Reg. No. 35,094, at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By


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